

Practice Problems 3C (Updated Version)

For #1-32, fill out the following table to interpret the given P-value. Calculate the P-value % and significance level % by multiplying by 100 and putting on the “%” sign. Compare the P-value % to the significance level % to determine if the P-value is higher or lower than the significance level. Use the rules for low and high P-values to answer the other question. Assume the P-value was calculated from data that passed all conditions.

	P-value	P-value %	Significance Level Proportion	Significance Level %	Low P-value or High P-value?	Could be sampling variability or Unlikely?	Reject H_0 or Fail to reject H_0 ?	Significant Evidence or Not?
1.	0.238		0.05					
2.	0.0003		0.01					
3.	5.7×10^{-6}		0.1					
4.	0.441		0.05					
5.	0.138		0.01					
6.	0		0.1					
7.	0.043		0.05					
8.	0.085		0.01					
9.	1.4×10^{-4}		0.1					
10.	0.112		0.05					
11.	0		0.01					
12.	0.539		0.1					
13.	0.0006		0.1					
14.	2.5×10^{-7}		0.01					
15.	0.861		0.05					
16.	0.199		0.05					
17.	0.034		0.05					
18.	0.128		0.01					
19.	8.6×10^{-4}		0.1					
20.	0.0437		0.05					
21.	0		0.01					
22.	0.612		0.1					
23.	0.087		0.05					
24.	0.0048		0.01					
25.	5.5×10^{-7}		0.1					
26.	0.0216		0.05					
27.	0.444		0.01					
28.	0.0539		0.1					
29.	0.722		0.1					
30.	3.8×10^{-3}		0.01					
31.	0.0823		0.05					
32.	0.0227		0.05					



33. According to a CNN report, 93% of all Americans also own a traditional phone. We disagree with this report. We think that the percentage has decreased as more and more Americans opt to only use a cell phone and throw away their traditional phones. A random sample of 106 Americans was taken and 86.8% of them owned a traditional phone. The p-value was found to be 0.0168. Use a 5% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $p = 0.93$ (93%)

Ha: $p < 0.93$ (93%) (CLAIM)

Sample Proportion $\approx 0.868 = 86.8\%$

P-value = 0.0168

- Convert the P-value into a percentage.
- Fill out the following sentence: If the null hypothesis is true and the population parameter is _____, there is a _____ probability getting the sample statistic _____ or more extreme because of sampling variability.
- Compare the P-value % to the 5% significance level. Is this a “Low P-value” or a “High P-value”.
- If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (“Could Be” or “Unlikely”). Explain why you picked your answer.
- Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. (“Reject H_0 ” or “Fail to reject H_0 ”). (The data did pass all the conditions.) Explain why you picked your answer.
- Is this P-value considered “Significant Evidence” or “Not Significant Evidence”? (The data did pass all conditions.) Explain why you picked your answer.

34. According to a recent Newspaper article, the population mean average amount of time people in California spend eating and drinking per day is 1.25 hours. In order to test this claim, we take a random sample of 400 people in California. The sample mean average was 1.22 hours and a p-value of 0.248 was found. Use a 10% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $\mu = 1.25$ hours (claim)

Ha: $\mu \neq 1.25$ hours

Sample Mean = 1.22 Hours

- Convert the P-value into a percentage.
- Fill out the following sentence: If the null hypothesis is true and the population parameter is _____, there is a _____ probability getting the sample statistic _____ or more extreme because of sampling variability.
- Compare the P-value % to the 5% significance level. Is this a “Low P-value” or a “High P-value”.
- If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (“Could Be” or “Unlikely”). Explain why you picked your answer.
- Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. (“Reject H_0 ” or “Fail to reject H_0 ”). (The data did pass all the conditions.) Explain why you picked your answer.
- Is this P-value considered “Significant Evidence” or “Not Significant Evidence”? (The data did pass all conditions.) Explain why you picked your answer.



35. According to an article in *USA Today*, 74% of Americans own a credit card. We disagree with the *USA Today* article. We claim that more than 74% of Americans own a credit card. In order to verify the claim that more than 74% of Americans have a credit card, a random sample of 250 Americans was taken and 77.2% of them owned a credit card and a p-value of 0.1244 was found. Use a 5% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $p = 0.74$ (74%)

Ha: $p > 0.74$ (74%) (CLAIM)

Sample Proportion = 77.2%

- Convert the P-value into a percentage.
- Fill out the following sentence: If the null hypothesis is true and the population parameter is _____, there is a _____ probability getting the sample statistic _____ or more extreme because of sampling variability.
- Compare the P-value % to the 5% significance level. Is this a “Low P-value” or a “High P-value”.
- If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (“Could Be” or “Unlikely”). Explain why you picked your answer.
- Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. (“Reject H_0 ” or “Fail to reject H_0 ”). (The data did pass all the conditions.) Explain why you picked your answer.
- Is this P-value considered “Significant Evidence” or “Not Significant Evidence”? (The data did pass all conditions.) Explain why you picked your answer.

36. It has long been thought that the population mean average body temperature is 98.6 degrees Fahrenheit. A recent study is now claiming that the population mean average body temperature is really lower than 98.6 degrees. A random sample of 50 adults worldwide was conducted and the average temperature was 98.26 degrees with a p-value of 0.0014 was found. Use a 1% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $\mu = 98.6$ degrees Fahrenheit

Ha: $\mu < 98.6$ degrees Fahrenheit (CLAIM)

Sample Mean = 98.26 degrees Fahrenheit

- Convert the P-value into a percentage.
- Fill out the following sentence: If the null hypothesis is true and the population parameter is _____, there is a _____ probability getting the sample statistic _____ or more extreme because of sampling variability.
- Compare the P-value % to the 5% significance level. Is this a “Low P-value” or a “High P-value”.
- If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (“Could Be” or “Unlikely”). Explain why you picked your answer.
- Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. (“Reject H_0 ” or “Fail to reject H_0 ”). (The data did pass all the conditions.) Explain why you picked your answer.
- Is this P-value considered “Significant Evidence” or “Not Significant Evidence”? (The data did pass all conditions.) Explain why you picked your answer.



37. It has been suggested that at least 10% of the world population is left handed. To test this claim, a sample of 77 randomly selected adults was taken and we found that 14.3% of them were left handed. A P-value of 0.895 was found. Use a 5% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $p \geq 0.1$ (10%) (CLAIM)

Ha: $p < 0.1$ (10%)

Sample Proportion $\approx 0.143 = 14.3\%$

- Convert the P-value into a percentage.
- Fill out the following sentence: If the null hypothesis is true and the population parameter is _____, there is a _____ probability getting the sample statistic _____ or more extreme because of sampling variability.
- Compare the P-value % to the 5% significance level. Is this a “Low P-value” or a “High P-value”.
- If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (“Could Be” or “Unlikely”). Explain why you picked your answer.
- Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. (“Reject H_0 ” or “Fail to reject H_0 ”). (The data did pass all the conditions.) Explain why you picked your answer.
- Is this P-value considered “Significant Evidence” or “Not Significant Evidence”? (The data did pass all conditions.) Explain why you picked your answer.

(#38-40) Use the “theoretical distributions” menu in StatKey at www.lock5stat.com to look up the P-value. Click on the button that says “normal”. Click on the tail and enter the test statistic in the bottom box below the tail. Remember in a two-tailed test, you will need to add the proportions in both tails to get the P-value.

38. Z-test statistic = 2.41

Two-tailed test

P-value =

39. Z-test statistic = -1.38

Left-tailed test

P-value =

40. Z-test statistic = 1.02

Right-tailed test

P-value =

(#41-43) Use the “theoretical distributions” menu in StatKey at www.lock5stat.com to look up the following critical values. Click on the button that says “t” and enter the given degrees of freedom. Click on the tail and enter the test statistic in the bottom box below the tail. Remember in a two-tailed test, you will need to add the proportions in both tails to get the P-value.

41. T-test statistic = -2.471

Two-tailed test

Degrees of Freedom = 29

P-value =

42. T-test statistic = 1.352

Right-tailed test

Degrees of Freedom = 34

P-value =



43. T-test statistic = -1.644
Left-tailed test
Degrees of Freedom = 49
P-value =

(#44-45) Use the “theoretical distributions” menu in StatKey at www.lock5stat.com to look up the following critical values. Click on the button that says “ χ^2 ” and enter the given degrees of freedom. Click on “right tail” and enter the test statistic in the bottom box below the tail.

44. χ^2 -test statistic = 38.724
Right-tailed test
Degrees of Freedom = 4
P-value =

45. χ^2 -test statistic = 1.551
right-tailed test
Degrees of Freedom = 3
P-value =

(#46-47) Use the “theoretical distributions” menu in StatKey at www.lock5stat.com to look up the following critical values. Click on the button that says “F” and enter the given degrees of freedom. Click on “right tail” and enter the test statistic in the bottom box below the tail.

46. F-test statistic = 1.724
Right-tailed test
Numerator Degrees of Freedom = 5
Denominator Degrees of Freedom = 29
P-value =

47. F-test statistic = 8.724
Right-tailed test
Numerator Degrees of Freedom = 4
Denominator Degrees of Freedom = 34
P-value =

